

REMARKS

In view of the above amendments and the following remarks, reconsideration of the outstanding office action is respectfully requested.

Melons are members of the Cucurbitaceae family and belong to the *Cucumis melo* L. species. Melons have been divided into a number of groups, based on the phenotypic and morphologic differences within the *C. melo* species. One commonly recognized grouping of melons includes the following groups: (1) *C. melo agrestis* Naud. (e.g., wild melons with inedible fruits); (2) *C. melo cantalupensis* Naud. (e.g., cantaloupe, muskmelon); (3) *C. melo indorus* Naud. (e.g., winter melon); (4) *C. melo flexuosus* (e.g., snake melon); (5) *C. melo conomon* (e.g., pickling melon, sweet melon); (6) *C. melo chito/C. melo dudaim* Naud. (e.g., mango melon); and (7) *C. melo momordica* (e.g., snap melon). In the present application, the term "melon" is used interchangeably with *C. melo*.

In terms of commercial importance, the three most important melon groups are *C. melo cantalupensis*, *C. melo indorus*, and *C. melo flexuosus*. These three groups may be crossed with one another, themselves, or other melon groups to produce seeds that develop into melon plants with characteristics from more than of one of the melon groups.

The *C. melo cantalupensis* group is not grown commercially in the United States to any great extent. This group is referred to as the "true cantaloupe." This group includes the melons commonly referred to as cantaloupe and muskmelon. These melons have medium size fruits with netted, warty, or scaly surfaces. Their flesh are usually orange, but sometimes green, and their flavor is aromatic or musky. Their fruit are dehiscent at maturity, and they are usually andromonoecious. This group includes melons that have been grouped into the *C. melo reticulatus* group. The *C. melo reticulatus* group has been described to include the melons having a netted surface.

The *C. melo inodorus* group is referred to as winter melon and includes such melons as honeydew, casaba, Crenshaw, Santa Claus melon, Persian melon, and Juan Canary. The honeydew melon is the most important melon in commercial terms. These melons appear smooth or wrinkled on their surface and have white or green flesh. They lack any musky odor. As compared to melons of the *C. melo cantalupensis* group, melons of the *C. melo indorus* group are usually larger, later to mature, and longer-keeping. They are not dehiscent at maturity. They are usually andromonoecious.

Melons in the *C. melo flexuosus* group are commonly referred to as snake melons. Their fruit are long and slender and are used at their immature stage as an alternative to cucumber. These melons are monoecious.

Gummy stem blight ("GSB") is one of the most serious diseases of melon in the United States and throughout the world. The disease is caused by the fungus *Didymella bryoniae* (Auersw.) Rehm (synonyms: *Mycosphaerella citrullina* (C.O. Sm.) Gross. and *M. melonis* (Pass.) Chiu & J. C. Walker) and its anamorph *Phoma cucurbitacearum* (Fr:Fr.) Sacc. (synonyms: *Asochyta cucumis* Fautrey & Roum. and *A. citrullina* (F. Chester) C. O. Sm.). The disease is most common in tropical and sub-tropical areas of the world, but it is also a serious disease of cucurbits in the United States. In the southeastern states, GSB is the most destructive disease of watermelon (*Citrullus lanatus*) and cucumber (*Cucumis sativus*), and also causes serious losses in melon. The disease has increased in importance in recent years as effective chemical and genetic control of other cucurbit diseases has become available.

Symptoms of GSB include circular, tan to dark-brown spots on leaves that may enlarge under favorable conditions to cover the leaf. On cotyledons and stems of young plants, circular black or tan lesions may be evident. Water-soaked areas may develop on hypocotyls and leaves. Cankers may appear in stem cortical tissue that produce a typical brown, gummy exudate and may girdle the stem, resulting in plant death.

Control practices include the use of fungicide-treated seed and a minimum two-year crop rotation. Although satisfactory chemical control can be achieved with fungicides, resistance to benzimidazole products has been reported.

Several sources of GSB resistance in wild *C. melo* accessions from the United States Department of Agriculture (U.S.D.A.) National Plant Germplasm System (N.P.G.S.) have been previously reported.

A recent study that employed both greenhouse and field evaluations yielded several new sources of resistance to GSB among the 800 accessions examined. Levels of resistance identified in this study were equal to or greater than any previously reported. Although genetic resistance was identified in *C. melo* in the 1960s and efforts to incorporate resistance into cultivated melon have been ongoing, no commercial varieties with adequate levels of resistance are currently available. Thus, there is still a need to incorporate higher levels of genetic resistance in melon varieties.

The present invention is directed to overcoming these deficiencies in the prior art.

The rejection of claims 1, 3-5, 22, 24-26, 45, 47-49, and 67-73 under 35 U.S.C. § 112 (1st para.) for lack of enablement is respectfully traversed.

The U.S. Patent and Trademark Office ("USPTO") has taken the position that seeds of the *Cucumis melo* plants recited in the claims must be available to the public or must

be deposited in a public depository in order to enable the claimed invention. Applicant respectfully submits that each of the *Cucumis melo* plants recited in the claims meets these requirements. In particular, Cornell ZPPM 339, TAM Uvalde, UC Topmark, Galia type, Ananas type, Oro Rico, U.S.D.A. Plant Introduction ("PI") 157082, PI 511890, PI 482399, PI 482398, and PI 140471 are all available to the public, either through commercial seed companies or through the U.S. National Plant Germplasm System, Ames, Iowa. With regard to NY 01-190-3R,-7L,-9L (composite), it appears that the USPTO has overlooked applicant's April 1, 2002, Preliminary Amendment, in which applicant informed the USPTO that representative seeds of NY 01-190-3R,-7L,-9L (composite) had been deposited as American Type Culture Collection ("ATCC") accession number PTA-3860 with the ATCC on November 13, 2001. This deposit was made in accordance with the Budapest Treaty. In particular, the receipt of deposit (see Exhibit 1 of the April 1, 2002, Preliminary Amendment) states the following:

The seeds will be made available if a patent office signatory to the Budapest Treaty certifies one's right to receive, or if a U.S. Patent is issued citing the seeds and ATCC is instructed by the United States Patent & Trademark Office or the depositor to release said seeds.

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The seeds will be maintained for a period of at least 30 years from date of deposit, or five years after the most recent request for a sample, whichever is longer.

In view of the above, applicant asserts that there is no need to submit an affidavit or declaration stating that the seeds will be irrevocably and without restriction or condition released to the public upon the issuance of a patent. For the above reasons, applicant respectfully submits that this rejection is inappropriate and should be withdrawn.

The rejection of claims 1-66 under 35 U.S.C. § 112 (1st para.) for lack of an adequate written description is respectfully traversed in view of the above amendments.

The rejection of claims 1, 6-17, 27-38, and 50-61 under 35 U.S.C. § 112 (1st para.) for lack of enablement is respectfully traversed in view of the above amendments.

The rejection of claims 19-21, 42, 44, 64, and 66-73 under 35 U.S.C. § 112 (2nd para.) for indefiniteness is respectfully traversed in view of the above amendments.

The rejection of claims 1, 2, 4-8, 10-12, 14-16, 18-20, 22, 23, 25-29, 31-33, 35-37, 39-41, 43-46, 48-52, 54-56, 58-60, 62, 63, 65, and 66 under 35 U.S.C. § 102(b) as anticipated by each of Prasad et al., "Inheritance of Resistance to *Mycosphaerella citrullina* in Muskmelon," J. Amer. Soc. Hort. Sci. 91:396-400 (1967) ("Prasad") and Norton et al., "AC-70-154, A Gummy Stem Blight-Resistant Muskmelon Breeding Line," HortScience

24(4):709-711 (1989) ("Norton") is respectfully traversed in view of the above amendments and the following remarks.

Prasad describes gummy stem blight resistant hybrids arising from crosses of PI 140471 with six different parents having various levels of resistance or susceptibility. The six parents were identified as HD-2 (Honey Dew #2), HBJ (Hales Best Jumbo), SP (Smith Perfect), C-8, A-4, and C-1. Gummy stem blight resistance in PI 140471 was attributed to a single dominant resistance gene.

Norton describes a gummy stem blight resistant muskmelon breeding line, AC-70-154, which originated from the cross PI 140471 x Georgia 47 (a susceptible melon cultivar), and which was developed through a program of backcrossing, disease screening, and inbreeding (i.e., selfing and sibbing).

The USPTO has taken the position that Prasad and Norton each teach the general method of crossing a gummy stem blight resistant *C. melo* with either a non-resistant or resistant *C. melo* to yield progeny that are resistant. Independent claims 1, 22, and 45 have been amended to recite the specific *C. melo* plants used in the crosses described in those claims. Nowhere does Prasad or Norton, separately or together, disclose crosses between the *C. melo* plants recited in amended claims 1, 22, and 45. Thus, applicant respectfully submits that this rejection is inappropriate and should be withdrawn.

The rejection of claims 1-8, 10-12, 14-16, 18-20, 22-29, 31-33, 35-37, 39-41, 43-52, 54-56, 58-60, 62, 63 65, and 66 under 35 U.S.C. § 102(a) as anticipated by Zuniga et al., "Monogenic Dominant Resistance to Gummy Stem Blight in Two Melon (*Cucumis melo*) Accessions," Plant Disease 83(12):1105-1107 (1999) ("Zuniga") is respectfully traversed. Zuniga describes the inventor's own work and, therefore, is not prior art under 35 U.S.C. § 102(a). In support of its position, applicant submits herewith the Declaration of Margaret M. Jahn Under 37 C.F.R. § 1.132. In view of this submission, the rejection based on Zuniga should be withdrawn.

The rejection of claims 1-20, 22-41, 43-63, 65, and 66 under 35 U.S.C. § 103(a) for obviousness over each of Prasad and Norton in view of each of Kalb et al., "Evaluation of Combining Ability, Heterosis, and Genetic Variance for Fruit Quality Characteristics in Bush Muskmelon," J. Amer. Soc. Hort. Sci. 109(3):411-415 (1984) ("Kalb"), Zhang et al., "Screening Melon (*Cucumis melo*) for Resistance to Gummy Stem Blight in the Greenhouse and Field," HortScience 32(1):117-121 (1997) ("Zhang"), and applicant's admission (referred to herein as "Applicant's Admission") is respectfully traversed.

Prasad and Norton are as described above. The USPTO has acknowledged that neither Prasad nor Norton discloses using UC Topmark, PI 157082, PI 511890, PI 482398, or PI 482399 in crosses. Kalb describes various fruit quality characteristics of a number of muskmelon breeding lines, including UC Topmark. Zhang describes a number of *C. melo* PI accessions as having resistance to gummy stem blight, including accessions such as PI 140471, PI 157082, PI 511890, PI 482398, and PI 482399. The USPTO has identified Applicant's Admission as referring to the specification's statement that resistance genes *Gsb1*, *Gsb2*, *Gsb4*, *Gsb5*, and *gsb3* are found in PI 140471, PI 157082, PI 511890, PI 482398, and PI 482399, respectively.

The USPTO has taken the position that it would have been obvious to one of ordinary skill in the art to use the breeding lines and gummy stem blight resistant PI accessions of Kalb and Zhang in the methods of Prasad and Norton to produce gummy stem blight resistant hybrids. Applicant respectfully disagrees.

A proper *prima facie* showing of obviousness requires the USPTO to satisfy three requirements. First, the prior art relied upon, coupled with knowledge generally available to one of ordinary skill in the art, must contain some suggestion which would have motivated the skilled artisan to combine or modify references. See In re Fine, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). Second, the USPTO must show that, at the time the invention was made, the proposed modification had a reasonable expectation of success. See Amgen v. Chugai Pharm. Co., 927 F.2d 1200, 1209, 18 USPQ2d 1016, 1023 (Fed. Cir. 1991). Finally, the combination of references must teach or suggest each and every limitation of the claimed invention. See In re Wilson, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

Application of these standards to the present invention demonstrates that the USPTO has failed to establish a *prima facie* case of obviousness for several reasons.

The USPTO has asserted that, at the time of the present invention, it would have been obvious to one of ordinary skill in the art to modify the methods of Prasad and/or Norton to incorporate the *C. melo* varieties described in Kalb and/or Zhang to yield the gummy stem blight resistant *C. melo* seeds of the present invention. In particular, the USPTO bases this assertion on its view that one of ordinary skill in the art would have been motivated to combine non-resistant *C. melo* lines such as those disclosed in Kalb (e.g., UC Topmark) with gummy stem blight resistant accessions such as those disclosed in Zhang (e.g., PI 140471) as part of a breeding program for producing gummy stem blight resistant melons.

As amended, the claims of the present invention include the limitation that the seeds, plants, tissue cultures, and other plant parts of the present invention, or produced by the methods of the present invention, be "commercially appealing." As discussed below, even if, assuming *arguendo*, there were some suggestion of combining the teachings of Prasad, Norton, Kalb, and Zhang (which there is none), there has been no showing by the USPTO of a reasonable expectation of success in achieving the presently claimed invention.

Regarding Prasad, the purpose of the crossing experiments reported therein was to determine the mode of inheritance (e.g., *via* single dominant resistance gene) of the gummy stem blight resistance trait from the resistant wild *C. melo* accession PI 140471. Nowhere does Prasad show or suggest that crossing PI 140471 with any of the non-resistant *C. melo* varieties recited in the claims of the present invention would yield a "commercially appealing" *C. melo* hybrid plant or breeding line. Norton is limited to crossing PI 140471 (as the resistance source) and Georgia 47 (as the recurrent parent) to develop a gummy stem blight resistant muskmelon breeding line. Norton does not, however, teach or even suggest that crossing PI 140471 with other non-resistant recurrent parents (such as the non-resistant cultivars recited in the claims of the present invention) would be reasonably likely to succeed in yielding "commercially appealing" *C. melo* hybrids or breeding lines. Zhang reports the results of screening various *C. melo* cultivars to determine their level of resistance to gummy stem blight resistance, but does not discuss (or even involve) any crosses or breeding studies. Although Kalb reports on the effectiveness of crossing various *C. melo* breeding lines to yield hybrids with favorable fruit quality traits, nowhere does Kalb discuss using a gummy stem blight resistant melon to impart gummy stem blight resistance in hybrid plants or breeding lines. For the foregoing reasons, the USPTO has failed to show that, at the time the invention was made, the proposed modification of the methods of Prasad and Norton in view of the disclosures of Kalb and Zhang had a reasonable expectation of succeeding in yielding the "commercially appealing" seeds, plants, tissue cultures, breeding lines, or plant parts of the present invention.

Thus, since the combination of Prasad, Norton, Kalb, and Zhang cannot even establish a *prima facie* case of obviousness, the rejection under 35 U.S.C. § 103 for obviousness over these references should be withdrawn.

The rejection of claims 1, 4-8, 10-12, 14-16, 18-22, 25-29, 31-33, 35-37, 39-45, 48-52, 54-56, 58-60, and 62-66 under 35 U.S.C. § 103(a) for obviousness over each of Prasad and Norton in view of Trulson et al., "*In vitro* Plant Regeneration in the Genus *Cucumis*," *Plant Science* 47:35-43 (1986) ("Trulson") is respectfully traversed.

Trulson teaches tissue culture and plant regeneration techniques. Because Trulson does not overcome the deficiencies of Prasad and Norton, as previously discussed herein, applicant respectfully submits that this rejection is improper and should be withdrawn.

The rejection of claims 67-73 under 35 U.S.C. § 102(b) as anticipated by or under 35 U.S.C. § 103 for obviousness over Prasad or Norton is respectfully traversed in view of the above amendments and the following remarks. Claims 67-73 are limited to seed, plants, tissue, or other parts of the gummy stem blight resistant *C. melo* breeding line designated as NY 01-190-3R,-7L,-9L (composite), which has been deposited under ATCC accession number PTA-3860. The specification makes it clear that the NY 01-190-3R,-7L,-9L (composite) breeding lines was derived from crosses involving the *C. melo* plants recited in claims 1, 22, and 45. As already described above and as acknowledged by the USPTO, Prasad and Norton do not teach, or suggest, the crosses recited in claims 1, 22, and 45, as amended. Thus, for these reasons, and in view of the above amendments, this rejection is improper and should be withdrawn.

The rejection of claims 67-73 under 35 U.S.C. § 102(a) as anticipated by or under 35 U.S.C. § 103 for obviousness over Zuniga is respectfully traversed. As discussed above, Zuniga is not prior art against the claims of the present invention. Therefore, this rejection should be withdrawn.

In view of all of the foregoing, applicant submits that this case is in condition for allowance and such allowance is earnestly solicited.

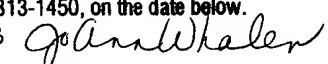
Respectfully submitted,

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